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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,768	12/12/2003	Rainer Mielke	2560-0417	8742

7590 03/23/2007  
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Washington, DC 20003

EXAMINER
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SMITH, NICHOLAS A

ART UNIT	PAPER NUMBER
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1742

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/23/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/733,768

Applicant(s)

MIELKE, RAINER

Examiner

Nicholas A. Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-15 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>10/28/04, 12/13/05</u>  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### Status of Claims

Claims 1-15 remain for examination.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Derehag et al (WO 02/072303) in view of Kiyomiya (JP 2002-292524) and Metzinger et al (US 6,542,843).

In regards to claim 1, Derehag et al. teaches a method of material removal including a linear oscillation of at least one of an electrode and a component to be machined is performed relative to the other, a circular oscillation of at least one of the electrode and the component to be machined is performed relative to the other, and a linear feed and a circular feed of at least one of the electrode and the component to be machined relative to the other are performed simultaneously, as well as simultaneously to at least one of the circular oscillation and the linear oscillation to form a complex shape, such as a blisk (p. 9, lines 8-18).

However, Derehag et al. does not specifically teach the method as electrochemical machining (ECM) in the presence of an electrolyte, only electrical discharge machining (EDM).

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Kiyomiya teaches (English abstract) utilizing a single apparatus for either ECM or EDM.

Metzinger et al teach a method of producing matched surfaces on rotor units with integral blades (claim 1) using either ECM or EDM (claim 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have utilized the feed/oscillation method of Derehag et al with an ECM method because Metzinger et al. teach that ECM and EDM were art recognized equivalents for the shaping of turbine blisks. Kiyomiya teach that one of ordinary skill in the art was aware that both EDM and ECM could have utilized the same apparatus for performing the shaping. Thus, one of ordinary skill in the art would have had a reasonable expectation of successfully applying the feed/oscillation method of Derehag et al. to an ECM method as disclosed by Metzinger et al.

In regards to claim 2, Derehag et al. teaches linear feed and oscillation by the electrode and circular feed and oscillation by the workpiece (p. 9, lines 8-18).

In regards to claim 4, Derehag et al. teaches removal of material on various portions of the component to be machined synchronously (p.3, lines 34-37).

In regards to claim 5, Derehag et al. teaches removal of material on various portions of the component to be machined separately (p. 3, lines 34-37).

In regards to claim 6, Derehag et al. teaches linear feed and oscillation by the workpiece and circular feed and oscillation by the electrode (p. 9, lines 8-18).

Claims 7-9, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Derehag et al. in view of Tchugunov (US Patent 6,835,299).

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Derehag et al. teaches an apparatus with a workpiece holder and an electrode holder with a linear drive capable of oscillating and feeding movements, a circular drive capable of reciprocating and feeding movements in which the apparatus is capable of simultaneous linear and circular feeding movements.

However, Derehag et al. does not specifically teach having a separate drive for each of the linear oscillating and feeding movements as well as having a separate drive for each of the circular oscillating and feeding movements, totaling four drives.

Tchugunov teaches an electrochemical machining apparatus that includes both a drive for linear feeding movement and a drive for linear oscillating movement (col. 3, lines 36-45). A linear feeding movement and a linear oscillating movement can be performed with either two separate drives (Tchugunov) or one drive (Derehag et al.). It would have been obvious to one of ordinary skill in the art at the time of invention to use either two separate drives of Tchugunov or one drive of Derehag et al. as they both facilitate machining of different shapes (Tchugunov, col. 3, lines 46-48 and Derehag et al., p. 9, lines 8-18). The same reasons as above applies to substituting a separate drive for circular feeding movement and for circular oscillating movement instead of only one drive capable of both movements.

In regards to claim 8, Derehag et al. teaches a circular drive associated with the workpiece holder (p. 11, claim 2) and linear drive(s) associated with the electrode (p. 9, lines 13-18).

In regards to claim 9, Derehag et al. in view of Tchugunov is applied for the same reasons as above in claim 7.

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In regards to claim 12, Derehag et al. does not specifically mention that either the electrode holder or the workpiece holder is transversable in at least one of the X and the Y directions.

Tchugunov teaches an electrode holder capable of transversable movement in X and Y directions (col. 4, lines 35-43). It would have been obvious to one of ordinary skill in the art at the time of invention to use Tchugunov's transversable electrode holder in Derehag et al.'s apparatus as it is capable of adjusting lateral position for machining (Tchugunov, col. 4, lines 38-43).

In regards to claims 13 and 14, Derehag et al. teaches an apparatus where circular movements are performed around an axis of linear oscillation movements (p. 9, lines 8-18).

In regards to claim 15, Derehag et al. in view of Tchugunov is applied for the same reasons as above in claim 7.

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Derehag et al. in view of Tchugunov and further in view of Burns et al. (US Patent 4,851,090) as in applicant's information disclosure statement as submitted on 10/28/04.

In regards to claim 10, Derehag et al. in view of Tchugunov teaches a linear drive but implies it is associated with the electrode holder.

However, Derehag et al. in view of Tchugunov does not specifically teach that a linear drive is associated with the workpiece holder.

Burns et al. teaches an apparatus for electrochemical machining of blisks using a workpiece holder with a linear drive (Figure 2). It would have been obvious to one of

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ordinary skill in the art to substitute Burns et al.'s linear drive associated with the workpiece holder in Derehag et al. in view of Tchugunov's linear drive as a linear drive on either the workpiece holder or the electrode holder would impart the same relative motion necessary to machine a blisk. In regards to having separate drives for each of the feeding and oscillating movements, Derehag et al. in view of Tchugunov is applied for the same reasons as above in claim 7.

In regards to claim 11, Derehag et al. in view of Tchugunov is applied for the same reasons as above in claim 7.

***Allowable Subject Matter***

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 3 is allowable for the following reason:

- Claim 3 is a method of electrochemical machining to form the negative of complex shapes, such as blisks, made by a sample complex shape (e.g., blisk) serving as an electrode. Derehag et al. teaches the machining steps of linear oscillating and feeding movements as well as the steps of circular oscillating and feeding movements, performed simultaneously. Derehag et al. also teaches the manufacturing of the electrode tool (p. 10, lines 1-3), implied to be used to made for making multiple blisks as in the above method. However, Derehag et al. does not suggest machining the electrode tool (i.e, the negative of the complex shape) by the above

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specific method of linear oscillating and feeding movements as well as the steps of circular oscillating and feeding movements, performed simultaneously. Therefore, claim 3 would be patentable if properly rewritten as stated above.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas A. Smith whose telephone number is (571)-272-8760. The examiner can normally be reached on 8:30 AM to 5:00 PM, Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571)-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*Roy N. King*  
*SPE, AU1742*